

EPA Region 10 Superfund

**RELEASABLE**

Date

Initial

CONFIDENTIAL

10 January 1988

HARBOR ISLAND - REVIEW OF 104(e) RESPONSES  
WRITTEN ANALYSIS OF LOCKHEED SHIPBUILDING COMPANY

PRP CODE: 030

TAX ID#: 7666702950, -2951, -2960, -2970, -3011, -3016, -3017, -2475,  
-3015, -2525, -2485, -2490, -2585

RECOMMENDED PRIORITY: HIGH (PRELIMINARY)

Since 1959, Lockheed Shipbuilding Company (Lockheed) has owned approximately 25 ac identified as parcel 7666702950. This parcel is bordered by East Waterway, Todd Shipyards, Fisher Mills, and other industries, including a former secondary lead smelter. According to Mr. J.T. Lane (9 June 1987, personal communication), Lockheed's main facility on Harbor Island (Yard 1) is located on this parcel. Lockheed also operates a second facility in West Seattle (Yard 2).

Mr. J.T. Lane (9 June 1987, personal communication) indicated that in addition to parcel 7666702950, Lockheed also owns the entire area of Block 406 that is west of 16th Ave. SW, except for parcel 7666703015, which Lockheed currently leases from Fisher Mills. This contradicts the ownership information obtained by the U.S. Environmental Protection Agency, which indicated that this western portion of Block 406 (parcels 7666702951, -2960, -2970, -3011, -3016, and -3017) was owned by the Port of Seattle. Mr. Rice (5 June 1987, personal communication) stated that the Port of Seattle has never owned property along the West Waterway. Subsequent information suggested that the Washington Department of Natural Resources (WDNR) owns these parcels. Prior to 1984, the Port of Seattle managed these properties for the state. Since 1984, the WDNR has the responsibility for management. The WDNR stated that parcels 766672951, -2960, -2870, -3011, and -3017 are leased to Lockheed. Parcel 7666703016, a western extension at parcel 7666703015, is reportedly leased to Fisher Mills. This parcel is probably released by Fisher Mills to Lockheed along with parcel 7666703015. For the purposes of this analysis, this contiguous 2-ac strip, which is a western

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extension of parcels 7666702950 and 7666703015, will be considered part of the Lockheed Yard 1 site (i.e., parcel 7666702950).

Lockheed has also leased parcel 7666702525 from Fisher Properties, Inc. since 1966 (Lane, J.T., 9 June 1987, personal communication). This vacant property is located east of Yard 1 and east of 16th Ave. SW. When Lockheed was in full operation, this property was used as a parking lot. Lockheed also leases parcel 7666702475 from L & L Investments and parcels 7666702485, 7666702490, and 7666702585 from Robert J. Meagher. These properties are currently used for warehouse storage of steel and for parking, and a small metal forming and welding shop is located there.

In the U.S. EPA follow-up letter, Lockheed was requested to provide specific information on the number of years that Lockheed operated at each parcel. Mr. J.T. Lane (25 August 1987, personal communication) did not provide the date that Lockheed purchased parcel 7666702950, and he did not provide the dates Lockheed first leased parcels 7666702475, 7666703015, 7666702525, 7666702485, 7666702490, and 7666702585. Lockheed was also requested to provide information on the types of operations conducted on each parcel owned or leased by Lockheed. Mr. J.T. Lane (25 August 1987, personal communication) stated that Lockheed could not "readily ascertain which facilities are indicated by the tax identification numbers" and thus as "unable to respond by tax number." Although Mr. J.T. Lane stated that he could respond "by street address," no information was provided on the types of operations conducted on each of these parcels [see Enclosure 1 of (Lane, J.T., 25 August 1987, personal communication)].

Information regarding the general location and description of some operations conducted by Lockheed at Yard 1 (i.e., 7666702950) was provided in Enclosure 5 (Lane, J.T., 25 August 1987, personal communication). Enclosure 5 contains a 3-page list and eight site maps of Yard 1, which show the general arrangement of Yard 1, and the locations of the maintenance and electric shop, electronic shop, flame cutting facility, plate shop, metal shop, and unit assembly building.



Mr. J.T. Lane (9 June 1987, personal communication) provided information on past practices at parcel 7666702950. According to Mr. Lane, a shipyard has been in operation at this property since at least the 1920s. Between the 1920s and 1930s, large amounts of "coal tar" were used in the shipbuilding business. The coal tar was used to fill voids inside the ship and was spread over the hull as a protective coating. Although a detailed chronology of property ownership at this parcel has not been provided, Mr. Lane indicated that Associated Shipbuilders operated at this property from 1940 to 1945. The Puget Sound Bridge & Dredge Company apparently owned and operated a shipbuilding facility at this property from 1945 until 1959, when both the company and property were purchased by Lockheed Aircraft Company (Balch, P.D., 13 November 1986, personal communication).

The Lockheed shipyards are used primarily for construction of new ships, although limited refurbishing and refitting work has been performed. Until February 1986, Yard 1 was primarily used for construction (e.g., hull, superstructure, engines, reducing gears) and painting of ships. Activities at Yard 1 have since been reduced to limited steel fabricating and machining (Lane, J.T., 11 June 1987, personal communication). Prior to February 1986, the final outfitting (e.g., electrical systems, finishing, painting, refitting) of the ships was performed at Yard 2 in West Seattle.

Paints and solvents constitute the majority of hazardous materials used at Lockheed's Yard 1 (Lane, J.T., 9 June 1987, personal communication). Mr. J.T. Lane (25 August 1987, personal communication) stated that there is no information available in Lockheed files regarding the quantity of paints used since 1959. Volumes of paints used onsite were estimated at 70,000 gal in 1984, and at 37,000 gal in 1985 (Lane, J.T., 9 June 1987, personal communication). Mr. J.T. Lane (25 August 1987, personal communication) also stated that there is no information available in Lockheed files regarding the composition of paints used since 1959. However, he did provide material safety data sheets for "typical types of paint formulas which have been applied to the ships in Yard I." Historical information indicates that the shipyards have used lead-based paints, although Lockheed reportedly discontinued their use in 1966 (Harper-Owes 1983). Antifouling paints that contained copper were also applied to ship hulls and sandblasted off prior

to repainting. Copper often occurs at concentrations of 3,300 mg/kg in dry paint (i.e., 33 percent) (Harper-Owes 1983). Up to 25 percent of the original copper content may remain in an antifoulant paint when it is sandblasted off the ship (Harper-Owes 1983). After 1984, Lockheed designed and implemented a paint overspray control device to prevent paint from entering the Duwamish River (Metro 1985).

The types of solvents used by Lockheed include turpentine and paint thinner. Historically, 17,000 gal of turpentine and paint thinner were purchased in 1973, and over 7,740 gal were purchased in 1974 (Lane, J.T., 25 August 1987, personal communication; see Enclosure 3). In 1984, approximately 15,000 gal of solvents were used onsite, and in 1985 approximately 12,000 gal of solvents were used (Lane, J.T., 9 June 1987, personal communication). Although information on solvents used in 1981 was also provided in Enclosure 3 (Lane, J.T., 25 August 1987, personal communication), it is not readily interpretable.

Paints, solvents, and other flammable materials are currently stored in a flammable-materials building on Lockheed's property. Waste paints and solvents generated by Lockheed operations are currently placed in drums and stored in a container storage facility located onsite. The storage facility was designed according to RCRA requirements (Lane, J.T., 9 June 1987, personal communication). The materials are stored until they are removed by certified transporters.

Mr. J.T. Lane (9 June 1987, personal communication) indicated that during the everyday operation of the shipyard, some minor spillage of paints and solvents had occurred, but that none was of significant quantity. These minor spills were cleaned up with diatomaceous earth or other sorbent material, and the resultant material was placed in drums. Prior to 1980, this drummed spill material was transported to a local landfill for disposal. Since that time, the drummed spill material, along with solvent and paint wastes, has been transported offsite by waste recyclers.

Lockheed uses small quantities of numerous other potentially hazardous materials, such as acid cleaners, adhesives, developers, and various types



of oils. Lockheed was requested to provide information on the generic names and chemical characteristics of these materials (Lane, J.T., 9 June 1987, personal communication). Mr. J.T. Lane (25 August 1987, personal communication) provided a 57-page list of hazardous materials used by Lockheed. He stated that this listing was first prepared in 1984, and that prior listings are nonexistent. He also stated that Lockheed "cannot estimate volumes of each of the hundreds of controlled materials used each year, as no records of usage are maintained."

Mr. J.T. Lane (25 August 1987, personal communication; see Enclosure 6) also provided copies of Annual Generator Reports for the years 1981, 1984, 1985, and 1986. Prior listings are not available. These Annual Generator Reports are summarized below:

Year

- |      |   |
|------|---|
| 1981 | 1,500 lb waste paint with solvent from painting ships; 1,600 lb PCBs (phased-out electrical capacitors); transported by Northwest Tank Service, Widing Transportation, and Gresham Transfer to Chem-Security Systems (Arlington, OR).<br><br>3,074 lb waste oil transported by Northwest Tank Service (Seattle, WA) to their Seattle facility.  |
| 1984 | 56,319 lb waste paint and solvent/rags and containers contaminated with waste paint; transported by Amalgamated Services (Kent, WA) to Chemical Processors (Seattle, WA).<br><br>10,790 lb water contaminated with lead and oil from ship tank coating (EP toxic); transported by Northwest Tank (Seattle, WA) to their Seattle facility.   |
| 1985 | 3,903 lb flammable sludge; 1,952 lb lacquer thinner; 14,404 lb solids contaminated with flammable liquids; 60,313 lb paint/resins/solvents/sludge; transported by Resource Recovery (Seattle, WA) to Chemical Processors (Seattle, WA).<br><br>4,800 lb waste PCB liquid; transported by General Electric Co. (Portland, OR) to their Portland facility.<br><br>1,605 lb mixed flammable solvents; 390 lb lacquer thinner; 1,301 solids contaminated with flammable liquids; transported by Amalgamated Services, Inc. (Kent, WA) to Chemical Processors (Seattle, WA). |

1986        900 lb water contaminated with gasoline; transported by Northwest Environservice (Seattle, WA) to their Seattle facility.

Other hazardous materials that may be encountered in the shipbuilding business include asbestos, blasting grit, sodium arsenite, and launching grease. Asbestos is often removed during the refurbishment of old ships. Mr. J.T. Lane (9 June 1987, personal communication) stated that the "rip-out" activities involving asbestos occur in Yard 2, and that very little asbestos is handled in Yard 1. If asbestos is encountered in Yard 1, it is reportedly bagged and disposed of in landfills.

Blasting grit is used to clean steel plates and shapes. Prior to 1967, Lockheed used sand as an abrasive blasting grit. Since that time, slag material has been used for blasting grit. Lockheed purchased 4,500 tons of "copper blast slag," in 1973 and over 8,240 tons in 1974 (Lane, J.T., 25 August 1987, personal communication; see Enclosure 3). Mr. J.T. Lane (25 August 1987, personal communication) stated that in 1982, Lockheed purchased one or two boxcars of copper slag grit from ASARCO. According to Harper-Owes (1983), shipyards along the Duwamish River have also purchased slag from an abandoned copper smelter in British Columbia. The copper content of this slag is reported at approximately 1,000 mg/kg (Harper-Owes 1983). Harper-Owes (1983) did not state whether Lockheed used this slag. Mr. J.T. Lane (25 August 1987, personal communication; Enclosure 9) provided over 40 pages of information on blasting grit, including results of numerous chemical analyses of blasting grit. Historically, waste blasting grit was swept up and stored in dumpsters for transport to the landfill (Lane, J.T., 9 June 1987, personal communication). More recently, the waste blasting grit has been transported to an industrial cement kiln for reuse as a supplemental source of iron in the manufacturing of portland cement (Koch, R., 30 June 1986, personal communication).

Sodium arsenite, designated a hazardous substance under CERCLA, was used by Lockheed to control wood worms in shipyard dry docks. Prior to 1975, Lockheed treated their dry docks twice a year. However, from 1975 to



1981 Lockheed reduced its treatment to once a year (1,488 lb/yr of arsenic)(Tetra Tech 1985).

Launching grease (e.g., slipcoat) has also been used by Lockheed at Yard 1 (Lane, J.T., 25 August 1987, personal communication; see Enclosure 9). Information provided in Enclosure 9 indicated that each time copper slipcoat is used in cradles for boat launches, approximately 50 lb of copper powder is "lost to the river."

Historically, Lockheed operations also involved the use of steel shot. In 1973, 45 tons of steel shot were purchased, and in 1974 approximately 10-25 tons/mo were purchased (Lane, J.T., 25 August 1987, personal communication; see Enclosure 3).

According to Mr. J.T. Lane (9 June 1987, personal communication), all onsite PCB transformers either have been drained, flushed, and re-certified, or have been removed (see documentation provided in Enclosure 7 of Mr. J.T. Lane, 25 August 1987, personal communication). He also stated that Lockheed has no knowledge of any PCB spills (Lane, J.T., 25 August 1987, personal communication).

Several environmental investigations have been conducted at Lockheed's Harbor Island facility (Lane, J.T., 15 October 1986, personal communication). A copy of a 1983 report by Du Pont, which reviewed Lockheed's hazardous materials handling procedures, was requested. Mr. J.T. Lane (25 August 1987, personal communication) stated that this study was performed at the request and direction of the General Counsel's office of Lockheed Corporation and "is priveleged." Information on results of chemical analyses of slag blasting grit was presented previously. Additional environmental investigations that have been conducted onsite are discussed below (Lane, J.T., 25 August 1987, personal communication; Enclosure 9).

In February 1982, Lockheed submitted two water samples to Laucks Testing Laboratories (Laucks). Analytical results for both samples, which were collected from the plate burning tanks in Yard 1, are as follows: chromium

(0.19 and 0.32 mg/L), lead (0.06 and 0.06 mg/L), nickel (0.39 and 0.95 mg/L), zinc (2.6 and 4.8 mg/L), and copper (0.38 and 0.68 mg/L). Arsenic, mercury, cadmium, silver, and cyanide were undetected. In March 1982, Lockheed submitted one water sample (source unknown) to Laucks. Barium was detected at 4 mg/L, cadmium was detected at 0.04 mg/L, and lead was detected at 0.1 mg/L. Five other metals were undetected. In February 1983, Lockheed submitted one water sample to Laucks. Analytical results of this sample, which was collected from the plate burning tanks, showed that eight metals were undetected and barium was detected at 1 mg/L. In March 1982, Laucks analyzed seven water samples from Shipway No. 3 (Lane, J.T., 25 August 1987, personal communication). Results of analyses showed that barium was detected at 1 mg/L in one sample and cadmium was detected at 0.02-0.03 mg/L in four samples. Arsenic, chromium, lead, mercury, selenium, and silver were undetected in all samples.

On 16 August 1985, a 96-hr static fish bioassay was performed on waste sludge samples from five drums (possibly from the plate burning tanks) located at Lockheed (Lane, J.T., 25 August 1987, personal communication). Mr. J.T. Lane (25 August 1987, personal communication) provided the results of this analysis, which showed that the waste sludge sample was not hazardous.

On 27 September 1985, storm water samples were collected by Lockheed from "sewer traps" in each of Yards 1 and 2 (Lane, J.T., 25 August 1987, personal communication). These samples, which were mistakenly composited by the laboratory, showed the following analytical results of unfiltered samples: 320 mg/L oil and grease, 2.8 mg/L total copper, 8 mg/L total lead, 0.93 mg/L total arsenic, 2.2 mg/L total zinc, 0.90 mg/L total nickel, 0.91 mg/L total chromium, 0.13 mg/L total cadmium, and 0.009 total mercury. Results of analyses for eight metals in the filtered water samples showed that only zinc was detected (0.4 mg/L).

Surface water samples were also collected in April 1985 and January 1986 in the West Waterway and north of Harbor Island near Yard 1 [Pacific Marine Environmental Laboratory (PMEL) 1987]. Samples were analyzed for salinity, suspended particulate matter, trace metals, and organics (i.e.,



PAH, PCBs, DDT and its derivatives). PMEL (1987) stated that results of these analyses suggest that "Harbor Island shipyards" contribute a significant amount of dissolved copper, zinc, lead, and cadmium into Elliott Bay. PMEL (1987) also stated that the enrichment of copper and other trace metals directly north of Harbor Island is probably related to surface runoff during heavy rainfall (see p. 105 of PMEL 1987).

On 16 July 1986, Lockheed collected two water samples from stormwater particulate traps in the north and south sections of Yard 1. Analytical results for both samples are as follows: 4.4 and 4.1 mg/L oil and grease, 0.009 and 0.007 mg/L arsenic, 0.004 and <0.002 mg/L cadmium, 0.05 and 0.03 mg/L lead, 0.3 and 0.32 mg/L zinc, 0.065 and 0.07 mg/L copper, and <0.005 mg/L chromium (Lane, J.T., 25 August 1987, personal communication).

The locations of sanitary sewers and storm drains at Lockheed Yard 1 were made available from Tom Hubbard (undated, personal communication) of Metro. This information is currently on file.

Lockheed did not provide any information on insurance policies that may provide liability coverage for damages resulting from releases of hazardous materials. Mr. J.T. Lane (25 August 1987, personal communication) stated that policies predating 1978 are in storage and not readily available. Policies from 1978 to present have been temporarily relinquished to representatives of plaintiffs in the Standard Equipment vs. Boeing litigation and no other copies are available (Lane, J.T., 25 August 1987, personal communication).

For the purposes of this preliminary assessment, Tetra Tech recommends assigning a high priority to the Lockheed Shipbuilding Company. This ranking is based on the types of hazardous materials used, the historically high volumes of these chemicals used, and the past work practices of Lockheed at the site. A complete assessment was not possible due to the lack of environmental data, and because the information available on site history was limited.

## REFERENCES

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